

**CLAIMS**

1 1. A downhole releasable coupling, the coupling  
2 comprising a first substantially tubular member having  
3 a bore therethrough, a first screw thread around an  
4 outer surface thereof, one or more raised portions  
5 arranged circumferentially on the outer surface, the  
6 raised portions defining a first face surrounding the  
7 member and substantially perpendicular to the outer  
8 surface, the first face being directed toward the  
9 first screw thread, the first face having a plurality  
10 of first projections, each first projection having a  
11 substantially first straight portion arranged parallel  
12 to the bore and a first sloping portion, joining an  
13 apex of the first projection to a base of an adjacent  
14 projection; and a second tubular member having a bore  
15 therethrough, a second screw thread around an inner  
16 surface thereof, one or more raised portions arranged  
17 circumferentially on an outer surface thereof, the  
18 raised portions defining a second face surrounding the  
19 member and substantially perpendicular to the outer  
20 surface, the second face being at an end of the  
21 member, the second face having a plurality of second  
22 projections, each second projection having a  
23 substantially second straight portion arranged  
24 parallel to the bore and a second sloping portion,  
25 joining an apex of the second projection to a base of  
26 an adjacent projection; wherein the first tubular  
27 member slides within the second tubular member, the  
28 first and second screw threads mate and on part  
29 engagement of the screw threads, the first and second  
30 straight portions can meet to thereby transfer torque  
31 when a member is rotated in the direction of the screw  
32 threads.

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3 2. A downhole releasable coupling as claimed in Claim 1  
4 wherein the screw threads are right hand screw  
5 threads.

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7 3. A downhole releasable coupling as claimed in Claim 1  
8 or Claim 2 wherein the screw threads are multiple  
9 start threads.

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11 4. A downhole releasable coupling as claimed in any  
12 preceding Claim wherein the screw threads are double  
13 start screw threads.

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15 5. A downhole releasable coupling as claimed in any  
16 preceding Claims wherein the screw threads are square.

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18 6. A downhole releasable coupling as claimed in any  
19 preceding Claim wherein the screw threads have generous  
20 lead in edges so that the coupling can be re-engaged  
21 easily.

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23 7. A downhole releasable coupling as claimed in any  
24 preceding Claim wherein the tubular members are  
25 initially releasably attached to each other by  
26 shearable means.

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28 8. A downhole releasable coupling as claimed in Claim 7  
29 wherein the shearable means is one or more shear pins  
30 arranged through apertures on the second member and  
31 resting in pockets in the outer surface of the first  
32 member.

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1 9. A downhole releasable coupling as claimed in Claim 8  
2 wherein the apertures and the pockets align when the  
3 first and second straight portions abut.  
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5 10. A downhole releasable coupling as claimed in any  
6 preceding Claim wherein at least one o-ring is  
7 arranged at either end of the screw thread  
8 circumferentially around the tubular member.  
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10 11. A downhole releasable coupling as claimed in any  
11 preceding Claim wherein the coupling comprises four  
12 raised portions on each tubular member; each face  
13 providing two equidistantly spaced projections; four  
14 apertures being arranged through the raised portions  
15 of the second tubular; shear pins being located  
16 through each aperture into four pockets on the outer  
17 surface of the first tubular; and an o-ring located  
18 into a groove at each end of the screw thread of the  
19 first tubular member.  
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21 12. A drilling liner system comprising a running tool  
22 having a substantially cylindrical first body and a  
23 first bore therethrough, the first body having an end  
24 adapted for connection to a drill string, and a  
25 setting sleeve having a substantially cylindrical  
26 second body and a second bore therethrough, the second  
27 body having an end adapted for connection to a liner,  
28 wherein the running tool and the setting sleeve couple  
29 via a detachable coupling according to any one of  
30 Claims 1 to 11.  
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32 13. A drilling liner system as claimed in Claim 12  
33 wherein the running tool includes the first tubular

1       and the setting sleeve includes the second tubular  
2       member.

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4   14. A drilling liner system as claimed in Claim 12 or  
5       Claim 13 wherein the bores align to provide a  
6       continuous central bore through the system.

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8   15. A drilling liner system as claimed in any one of  
9       Claims 12 to 14 wherein the screw threads are right  
10      hand screw threads.

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12   16. A drilling liner system as claimed in any one of  
13      Claims 12 to 15 wherein the running tool includes one  
14      or more first radial outlets arranged  
15      circumferentially around the first body, the setting  
16      sleeve includes one or more second radial outlets  
17      arranged circumferentially around the second body, and  
18      in a first position the first and second radial  
19      outlets are aligned and fluid can pass radially from  
20      the system.

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22   17. A drilling liner system as claimed in Claim 16  
23      wherein there are four radial outlets in each body.

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25   18. A drilling liner system as claimed in Claim 16 or  
26      Claim 17 wherein the first position occurs when the  
27      first and second screw threads are partially engaged.

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29   19. A drilling liner system as claimed in any one of  
30      Claims 12 to 18 wherein the system further comprises a  
31      seal stem, the stem having a substantially cylindrical  
32      third body with a third bore therethrough, a third  
33      screw thread on an outer surface thereof for

1 engagement to the second screw thread, and a polished  
2 end distal to the screw thread. Once the running tool  
3 is decoupled from the setting sleeve, the stem can be  
4 connected to the setting sleeve to provide a polished  
5 bore receptacle to the setting sleeve for tie-back  
6 purposes.

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8 20.A method of setting a liner in a well bore, the  
9 method comprising the steps;

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- 11 (a) providing a drilling liner system according to any  
12 one of Claims 12 to 19;
- 13 (b) connecting the running tool and setting sleeve by  
14 engaging the screw threads until the first and  
15 second straight portions meet;
- 16 (c) connecting the running tool to a drill string and  
17 the setting sleeve to a liner;
- 18 (d) transmitting torque to the liner by rotating the  
19 drill string in a first direction;
- 20 (e) cementing the liner in place by introducing cement  
21 slurry axially into the bore, to allow the slurry to  
22 exit the liner and locate between the liner and the  
23 well bore; and
- 24 (f) rotating the drill string in a reverse direction  
25 until the screw threads disengage; and
- 26 (g) removing the running tool from the well bore.

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28 21.A method of setting a liner in a well bore as claimed  
29 in Claim 20 wherein the first direction is right hand  
30 rotation.

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32 22.A method of setting a liner in a well bore as claimed

1       in Claim 20 or Claim 21 wherein the method includes  
2       the step of removing an assembly from the well bore  
3       through the liner when the system is connected to the  
4       liner.

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6   23. A method of setting a liner in a well bore as claimed  
7       in Claim 20 or Claim 21 wherein the method includes  
8       the step of shearing the shearing means when the drill  
9       string is rotated in the reverse direction.

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11   24. A method of setting a liner in a well bore as claimed  
12       in any one of Claims 20 to 23 wherein the method  
13       includes the step of aligning the radial ports to  
14       expel fluid from the system.

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16   25. A method of setting a liner in a well bore as claimed  
17       in any one of Claims 20 to 24 wherein the method  
18       includes the step of rotating and reciprocating the  
19       system on the drill string during cementing.

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21   26. A method of setting a liner in a well bore as claimed  
22       in any one of Claims 20 to 25 wherein the method  
23       includes the steps of:

- 24   (a)   following rotation in the first direction, noting a  
25       first circulation pressure in the well bore;  
26   (b)   applying liner weight to bottom of well and partly  
27       releasing the running tool from the setting sleeve  
28       to shear the shear screws and align the radial  
29       ports;  
30   (c)   confirming that circulation pressure has dropped  
31       from the first circulation pressure;  
32   (d)   on pressure loss rotating the drill string until the  
33       straight portions meet; and

1 (e) confirming circulation pressure has returned to  
2 first circulation pressure.

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